



The Tools of Classroom Talk

In order for students to better understand mathematical concepts through problem solving and reasoning they need effective practice and time to develop a “**conversation**” with others about their mathematical thinking. One of the most important instructional tools we can provide for our students is the opportunity to “talk” out loud about how they solve mathematical problems. As adults we have the “conversation” in our heads as we tackle new problems to solve—we think about all the angles to approach the problem and make decisions about how to solve it a certain way based on our previous background, learning styles, and mathematical knowledge. Our students need to experience these “math conversations” with guidance from the teacher in order to become successful at math.

The following are five main “**talk moves**” or **strategies** to develop mathematical conversations in your classroom. I have found them to be very successful in helping students understand why and what they do in solving mathematical problems is effective or not. Through whole group (or small group) discussions of mathematical problems, students have a real chance to be engaged in sustained reasoning. The teacher’s role is to facilitate and guide—but does not focus on providing answers directly. Instead the focus is on the students’ mathematical thinking—which will lead to math discovery and conjecture of mathematical concepts that will be more deeply understood and remembered.

Revoicing (“*So you are saying it’s an odd number?*”)

When students talk about mathematics, it’s often very difficult to understand what they say. Even if their reasoning is sound, it may not appear sound when they try to put their thoughts into words. Sometimes it’s impossible to tell whether what they have said makes sense at all. And, if you as the teacher have trouble understanding it, there is not much hope that the student’s classmates will do any better. Yet giving your goals of improving the mathematical thinking of all students whose contributions are taken seriously are those who are easy to understand, few students will ever improve. Deep thinking and powerful reasoning do not always correlate with clear verbal expression.

Therefore, teachers need a talk move that can help them deal with the inevitable lack of clarity of many student contributions. They need a tool that will allow them to interact with the student in a way that will continue to involve that student in clarifying his or her own reasoning. And they need a tool that will help other students to continue to follow along in the face of confusion. One such tool has been called “revoicing”. In a revoicing move, the teacher essentially tries to repeat or paraphrase some or all of what the student has said, and then asks the student to respond and verify whether or not the teacher’s revoicing is correct.

For example:

The teacher has given her students a series of numbers to decide if they are even or odd. They have previously established that if a number can be divided by two evenly, then it is even.

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1. **Student #1:** Well, if we could use three, then it could go into that, but three is odd. So then if it was...but...three is even. I mean odd. So if it's odd, then it's not even.
2. **Teacher:** OK, let me see if I understand. So you are saying that 24 is an odd number?
3. **Student #1:** Yeah, because three goes into it, because 24 divided by 3 is eight.

Asking students to restate someone else's reasoning. (*"Can you repeat what he just said in your own words?"*)

In the first example the revoicing move was used by the teacher. However the teacher can also extend the move to students by asking one student to repeat or rephrase what another student has said, and then immediately follow-up with the first student.

4. **Teacher:** Can anyone repeat what student #1 has just said in his or her own words? Yes, student #2.
5. **Student #2:** Um, I think I can. I think he said that 24 is odd, because it can be divided by 3.
6. **Teacher:** Is that right, student #1? Is that what you said?
7. **Student #1:** Yes.

Asking students to apply their own reasoning to someone else's. (*"Do you agree or disagree and why?"*)

After a student has made a claim, and the teacher has made sure that the students have heard it and have had time to process it, she can move on to elicit student reasoning about the claim.

8. **Teacher:** Student #2, do you agree or disagree with what student #1 said?
9. **Student #2:** Well, I sort of.. like, I disagree.
10. **Teacher:** Can you tell us why you disagree with what he said? What's your reasoning?
11. **Student #2:** Because I thought that we said yesterday in class that you could divide even numbers by two. And I think you can divide 24 by 2. It's 12. So isn't that an even number?

Notice that the teacher has not yet supported either student but instead has used classroom math talk to elicit respectful discussion of ideas. The point of this agree and disagree move is to cause students to make explicit their reasoning by applying their thinking to someone else's contribution. In this way, the teacher is helping the students

to be able to verbalize “why” and “how” which is critical to understanding a child’s mathematical thinking.

Prompting students for further participation. (“*Would someone like to add on?*”)

At this point the teacher increases participation in the discussion by asking for further commentary. First she uses the move of revoicing again as a way of clarifying the two positions that have emerged, and to model how to talk respectfully to the originators of the two positions. Then she asks others to contribute, prompting them to state agreement or disagreement, or to add other comments. This prompting for more input on previous statements will, over time, result in students showing more willingness to weigh in on what the group is considering.

12. **Teacher:** So we have two different ideas here about the number 24. Student #1, you’re saying that 24 is odd because it can be divided by 3?

13. **Student #1:** Uh-huh.

14. **Teacher:** And Student #2, you’re saying that it’s even because you can divide it by 2? Is that correct?

15. **Student #2:** Yes.

16. **Teacher:** OK, so what about other people? Who would like to add to this discussion? Do you agree or disagree with Student #1 or #2? Tell us what you think, or add on to other comments or insights.

Using wait time. (“*Take your time...we’ll wait...* ”)

The final talk move is really not talk at all but silence! Many teachers are familiar with the important finding that after having asked a question, a teacher should wait at least 10 seconds for students to think before calling on someone for an answer. Wait time also comes into play after a student has been called upon. A student should be given the same amount of time to organize his or her thoughts.

In the example the teacher has presented a summary of Student #1 and #2’s positions on the number 24, and has asked for additional comments from the class. Then she waits..and waits.. and waits.. One or two students raise a hand immediately. Others look thoughtful, but don’t volunteer. After 5 seconds the students see that the teacher is waiting for more responses. These students know that in the classroom it is not always the same super fast two or three students who will answer all the questions. They know that the teacher will allow them time to think through her question. After 15 seconds or so she calls on Student #3.

17. **Student #3:** yes, I agree with Student #2 because the only way you told us to find out if a number is even is to divide it by 2. And if we divide 24 by 3, we can also divide it by 4 and 6 too. So I think we should stick with 2 only.

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